

ADDITIONAL FEE:

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R E M A R K S

The Office Action issued January 29, 2009 has been received and its contents have been carefully considered.

Claim 1 has been amended to incorporate the subject matter of claim 3 ("wherein the surface of the insulation core is flat...") and claim 20 ("wherein the sheet metal panel comprises a titanium-zinc alloy"). Claims 3 and 20 have been canceled. Claim 1 has therefore been directed to the embodiment of Fig. 1, which shows the arrangement 30 of capillary tubes applied directly to the planar surface of the insulation core 4, embedded in the adhesive layer 2.

Claims 2, 9 and 11, which are directed to the embodiment shown in Figs. 2 and 3 have accordingly been canceled as well.

Claims 5 and 19 have been amended to recite a Markush Group, to avoid the use of the alternative "or". Claims 11, 14 and 18 have been amended to clarify their language.

All of the claims of this application, as previously presented, have been rejected under 35 USC §103(a) as being unpatentable over two or more of the following references:

U.S. Patent No. 5,167,218 to Deakin,

U.S. Patent No. 4,336,793 to Ahearn,

U.S. Patent No. 4,606,327 to Bloor et al.,

U.S. Patent No. 4,517,721 to Graham,

U.S. Patent No. 4,191,169 to Hyman, and

U.S. Patent No. 5,389,159 to Kataoka et al.

These rejections are respectfully traversed because none, taken either individually or in combination, teach a self-supporting, heliothermal flat collector module for use as a roof shingle in which the capillary tubes are embedded in an adhesive layer between a pre-weathered, titanium-zinc alloy sheet metal panel and a planar surface of a thermally insulating, insulation core.

This arrangement, whereby the capillary tubes are embedded in a non-metallic, elastic adhesive layer and sandwiched between a planar sheet metal panel and the planar surface of the insulation core is substantially easier and less expensive to manufacture than solar collectors in which the capillaries are embedded in notches within the insulation core. This module construction is also more

efficient, in terms of energy transfer to the fluid within the capillary tubes, than solar panels with a transparent sheet covering the capillary tubes. No matter how transparent this sheet may be, it necessarily reflects more radiation than does a pre-weathered sheet metal panel made of titanium-zinc alloy.

The patents to Deakin, Bloor et al., Graham and Hyman were thoroughly reviewed and explained in applicants' Amendment dated January 20, 2008 and/or were discussed with the Examiner at the personal interview held on July 29, 2008. Consequently, no further detailed remarks about these references are believed to be necessary.

In Deakin, the capillary tubes are placed in a "box" and receive radiation through a transparent sheet. This arrangement is substantially less efficient than that of the present invention, which absorbs radiation through the pre-weathered metal plate.

In Bloor et al., the capillary tubes are passed through ducts without any adhesive or other support. No mention is made of an insulation core with a planar surface disposed beneath the capillary tubes.

Graham discloses a solar heat exchanger similar to that of Deakin which supports a sheet of glass above the capillary tubes. The capillary tubes are supported within the panel by a plate shaped member 10, without the use of an adhesive.

Similarly, the patent to Hyman forms capillary tubes 18 between two copper plates 16 and 20. Transparent sheets 30 and 26, disposed above the capillary tubes, reduce the efficiency of the panel by reflecting light. No adhesive is used to support the capillary tubes.

In Ahearn, the capillary tubes are surrounded by a loop in the sheet metal strip, best illustrated in Figs. 1 and 2. There is no mention of any further layers, such as an elastic adhesive layer and an insulation core.

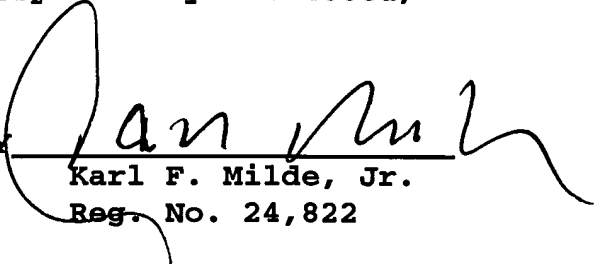
The patent to Kataoka et al. discloses a solar cell module with a semiconductor layer for converting light into electricity. Capillary tubes are not used at all.

In summary, therefore, it is respectfully submitted that claim 1, as amended, distinguishes patentably over all of the references made of record in this application. Since all of the remaining claims depend either directly or indirectly from claim 1, this application is believed to be

in condition for immediate allowance. A formal Notice of Allowance is accordingly respectfully solicited.

Respectfully submitted,

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By



Date APRIL 29, 2009